

LAMPIRAN

Lampiran 1 Daftar Konversi Satuan

(Sumber : *Tables And Diagrams For Refigeration & AC-Technicians*)

1. Panjang (length) = L

1 millimeter	=	0,0394 inchi	=	1.000 micron	=	0,001 meter
1 centimeter	=	0,3937 inchi	=	0,03281feet	=	0,01 meter
1 meter (m)	=	39,37 inchi	=	3,2808 feet	=	1,0936 yard
1 kilometer	=	3.280,83 feet	=	1.093,61 yard	=	0,6214 mile
1 inchi	=	25,4 mm	=	2,54 cm	=	0,0833 feet
1 foot (ft)	=	30,48 cm	=	0,3048 meter	=	12 inchi
1 yard (yd)	=	0,9144 meter	=	36 inchi	=	3 feet
1 mile	=	1,6093 km	=	5.280 feet	=	1.760 yard

2. Luas area = A = L²

1 cm ²	=	0,155 in ²	=	100 mm ²	=	0,0001 m ²
1 meter ²	=	1.550 in ²	=	10,76391 ft ²	=	1,1959 yd ²
1 inchi ²	=	645,163 mm ²	=	0,00694 ft ²	=	6,4516 cm ²
1 foot ²	=	929,0304 cm ²	=	144 in ²	=	0,1111yd ²
1 yard ²	=	0,8361 m ²	=	1.296 in ²	=	9 ft ²

3. Isi (volume) =v = l³

1 cm^3	=	0,001 dm^3	=	0,06124 in^3	=	1.000 mm^3
1 dm^3	=	61,025 in^3	=	0,03531 ft^3	=	1.000 cm^3
1 $meter^3$	=	1.000 dm^3	=	1,30795 yd^3	=	35,3146 ft^3
1 $inch^3$	=	0,0164 dm^3	=	16,3871 cm^3	=	1/1728 ft^3
1 $foot^3$	=	28,3168 dm^3	=	0,02832 m^3	=	1,728 in^3
1 $yard^3$	=	764,56 dm^3	=	27 ft^3	=	202 US gal.
1 us gallon	=	3,7854 liter	=	231,1 in^3	=	0,327 UK gal.
1 uk gallon	=	4,5461 liter	=	277,3 in^3	=	1,2009 US gal.
1 us gallon	=	119,24 liter	=	4,2104 ft^3	=	31,5 US gal.
1 barrel (oil)	=	158,9898 liter	=	5,6138 ft^3	=	42 US gal.

4. Berat massa (weight) = m

1 gram (g)	=	0,001 kg	=	15,4323 grain	=	0,0353 ounce
1 kilogram	=	1.000 gram	=	2,204 poun	=	35,274 ounce
1 grain (gr)	=	0,0648 gram	=	0,00228 ounce	=	1/7000 pound
1 ounce (oz)	=	28,3495 gram	=	0,0625 pound	=	437,5 grain
1 pound (lb)	=	0,4356 kg	=	7.000 grain	=	16 ounce
1 short ton	=	907,184 kg	=	2000 pound		
1 metric ton	=	1.000 kg	=	2.204,62 pound		

1 long ton	=	1.016,0469 kg	=	2.240 pound
1 troy ounce	=	31,1035 gram	=	480 grain
1 dyne	=	10^{-5} newton	=	0,00102 gram-f = 1/981 gram-f
1 newton	=	10^{-5} dyne	=	102 gram-f = 0,2248 lb-f
1 gram-force	=	0,0098 newton	=	980,66 gram-f = 0,001 kg-f
1 kilogram-f	=	9,8066 newton	=	1.000 gram-f = 2,2046 lb-f
1 pound-force	=	4,4482 newton	=	453,6 gram-f = 0,4536 kg-f

5. Energi, Kalor, Usaha atau Kerja (work) = $W = F \times d$

1 erg	=	10^{-7} joule	=	1 dyn.cm	=	$9,486^{-11}$ Btu
1 joule (j)	=	10^7 erg	=	1 N.m	=	0,228 watt.s
	=	0,1019 kg.m	=	0,00095 Btu	=	0,2389 kalori
1 kilo joule	=	1.000 joule	=	0,9478 Btu	=	238,9 kalori
1 mega joule	=	1.000 kj	=	947,8 Btu	=	0,278 kWh
1 kWh	=	3,6 Mj	=	3.412,76 Btu	=	860,5165 kkal
1 kalori	=	4,1868 joule	=	0,00397 Btu	=	0,4267 kg.m
1 kilo kalori	=	4.186,8 joule	=	3,968 Btu	=	1,1619 watt.h
1 btu	=	1.054,8joule	=	0,293 watt.h	=	0,2522 kkal

6. Daya atau Tenaga (power) = $p = W/t$

1 watt (s)	=	10^7 erg/s	=	3,413 Btu/h	=	0,8605 kkal/h
1 kilo watt	=	1.000 watt	=	0,9478 Btu/h	=	0,2389 kkal/s
	=	101,97 kg	=	737,56 ft.lb/s	=	1,3596 mt.HP
1 metrik HP	=	753,5 watt	=	75 kg.m/s	=	0,1758 kkal/s
	=	0,9863 Bt.HP	=	542,5 ft.lb/s	=	0,6971 Btu/s
1 British HP	=	745,699 watt	=	550 ft.lb/s	=	1,0138 mt.HP
1 kkal/s	=	4,1868 KW	=	426,7 kg.m/s	=	3,968 Btu/s
1 kkal/s	=	1,1619 watt	=	3.086 ft.lb/h	=	3,968 Btu/s
1 Btu/s	=	1,055 KW	=	778,16 FT.LB/S	=	0,2522 kkal/s
1 Btu/h	=	0,293 watt	=	0,0004 Bt.HP	=	0,2522 kkal/h

7. Tekanan (pressure) = $p = F/A$

1 pascal (pa)	=	0,0075 mm Hg	=	1 N/m^2	=	10 dyn/cm^2
1 kpa	=	0,2953 in Hg	=	1.000 pascal	=	$0,145 \text{ lb/in}^2$
	=	75006 mm Hg	=	$0,0102 \text{ kg/cm}^2$	=	0,0098 atm
1 bar(cairan)	=	750 mmHg	=	100 kpa	=	10^6 dyn/cm^2
1 Atmosfir	=	760 mmHg	=	101,325 kpa	=	1,0132 bar
Standar	=	29,921 in Hg	=	$1,0332 \text{ kg/cm}^2$	=	$14,696 \text{ lb/cm}^2$
1 mmHg (torr)=	=	0,3937 in Hg	=	$0,00132 \text{ kg/cm}^2$	=	133,322 pascal

$$\begin{aligned}
 1 \text{ inchi Hg} &= 25,4 \text{ mmHg} = 0,03453 \text{ kg/cm}^2 = 0,0324 \text{ atm} \\
 1 \text{ kg/cm}^2 &= 7535,559 \text{ mmHg} = 14, 22234 \text{ lb/in}^2 = 0,9678 \text{ atm} \\
 1 \text{ lb/in}^2 \text{ (psi)} &= 51,7147 \text{ mmHg} = 0,07031 \text{ kg/cm}^2 = 0,068004 \text{ atm} \\
 &= 2,036 \text{ in Hg} = 6.894,94 \text{ pacal} = 144 \text{ lb/ft}^2
 \end{aligned}$$

Lampiran 2 Efisiensi *Heat Exchanger*

1. Efisiensi HE pada Tekanan 75 Psi

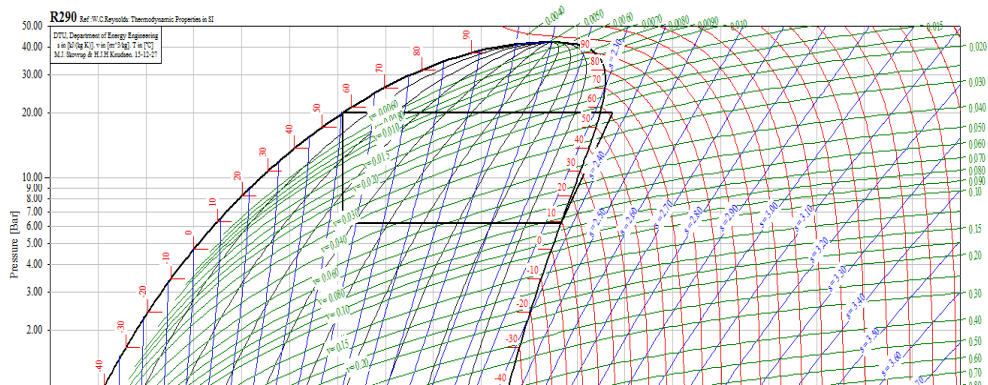
Tabel L2.1 Propertis Efisiensi HE 75 Psi

Temperatur air ACWH	: 58,1 °C
Temperatur air awal	: 32,7 °C
Temperatur pipa <i>in</i> ACWH	: 79,0 °C
Temperatur pipa <i>out</i> ACWH	: 48,1 °C
Temperatur pipa <i>out</i> Kondensor	: 36,4 °C
Temperatur pipa <i>out</i> evaporator	: 28,74 °C
Tekanan AC	: 75 Psi
Tekanan <i>out</i> Kompresor	: 275 Psi

- **Cycle 1**

- Masukkan nilai Tekanan AC di *Evaporating Temperature* (ET).
- Masukkan nilai Tekanan *out* kompresor di *Condensing Temperature* (CT).
- Kemudian klik *draw cycle*. Maka akan terlihat grafik yang menunjukkan kerja kompresor sampai *heat exchanger*.

Gambar L2.1 Cycle 1 Coolpack pada Tekanan 75 Psi



Gambar L2.2 Grafik Hasil Cycle 1 pada Tekanan 75 Psi

- Kemudian klik *cycle info* untuk melihat nilai ET dan CT yang sudah dimasukkan.
- Nilai ET = 9,12°C
- Nilai CT = 57,16°C

Cycle info [One stage]. Refrigerant: R290

Select cycle number: (1)

Delete cycle

Values:			
Evaporating temperature [°C]:	9.12	Condensing temperature [°C]:	57.16
Superheat [K]:	0.00	Subcooling [K]:	0.00
Dp evaporator [bar]:	0.00	Dp condenser [bar]:	0.00
Dp suction line [bar]:	0.00	Dp liquid line [bar]:	0.00
Dp discharge line [bar]:	0.00		
Isentropic efficiency [0-1]:	1.00		

Calculated:	
Qe [kJ/kg]:	227.280
Qc [kJ/kg]:	281.471
COP:	4.19
W [kJ/kg]:	54.191
Pressure ratio [-]:	3.235

Dimensioning:	
Qe [kW]:	0.000
Qc [kW]:	0.000
m [kg/s]:	0.00000000
V [m³/h]:	0.0000
W [kW]:	0.000
Q loss [kW]:	0.000

Volumetric efficiency:	
n_vol:	0.00
Displacement [m³/h]:	0

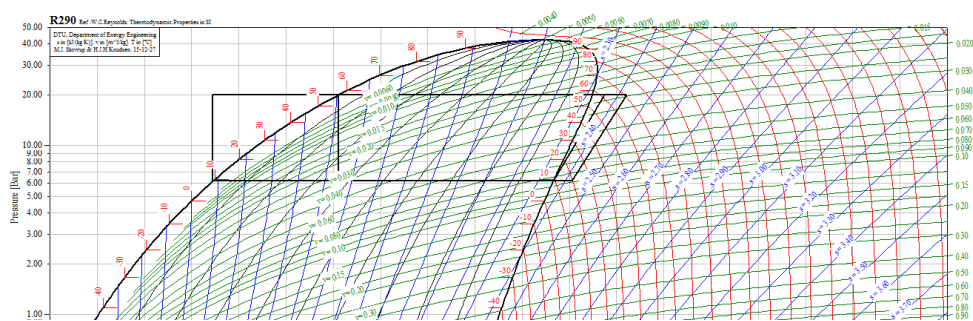
Gambar L2.3 Cycle 1 Info pada Tekanan 75 Psi

- **Cycle 2**
 - Masukkan nilai Tek. AC di ET.
 - Masukkan nilai Tek. *Out* kompresor di CT.

- $Superheat = T_{\text{pipa out evaporator}} - ET = 28,74 - 9,12 = 19,62^{\circ}\text{C}$.
- $Subcooling = CT - T_{\text{pipa out ACWH}} = 57,16 - 48,1 = 9,06^{\circ}\text{C}$.

Gambar L2.4 Cycle 1 Info pada Tekanan 75 Psi

- Kemudian klik *draw cycle*. Maka akan terlihat grafik yang menunjukkan kerja kompresor, *heat exchanger*, dan kondensor.



Gambar L2.5 Grafik Hasil Cycle 2 pada Tekanan 75 Psi

- Kemudian klik *cycle info*, pilih *cycle number 2*. Lalu klik *Coordinates of points*. Catat hasil dari h_1 dan h_2 .
- Nilai $h_1 = 602,743 \text{ kJ/kg}$, $h_2 = h_{2s} = 660,514 \text{ kJ/kg}$.

Cycle info [One stage]. Refrigerant: R290

Select cycle number:

(1)
(2)

Delete cycle

Calculated:
Qe [kJ/kg]:
Qc [kJ/kg]:
COP:
W [kJ/kg]:
Pressure ratio:

Values at points in cycle

Values at points 1-6,15 for the selected one stage cycle

Point	T [°C]	P [bar]	v [m³/kg]	h [kJ/kg]	s [kJ/(kg K)]
1	19.619	6.170	0.078734	602.743	2.4258
2	71.126	19.960	0.024399	660.514	2.4258
3	71.126	19.960	0.024399	660.514	2.4258
4	9.060	19.960	N/A	222.455	N/A
5	9.122	6.170	N/A	222.455	N/A
6	19.620	6.170	0.078727	602.743	2.4258
15	N/A	19.960	N/A	222.455	N/A

°C): 57.16
48.10
0.00
0.00

Gambar L2.6 Values at point in cycle 2

- Setelah itu, buka aplikasi Refprop untuk mencari h_2 .
- Klik option unit, temperatur K menjadi °C, pressure Mpa menjadi bar.
- Klik substance, purefluid (singel compounds), pilih propane, klik ok.
- Klik calculate, spesifited state points.
- Masukkan T_{pin} in HE dan Tekanan out Kompresor, klik enter.

REFPROP (propane) - NIST Reference Fluid Properties

File Edit Options Substance Calculate Plot Window Help Cautions

1: propane: Specified state points

	Temperature (°C)	Pressure (bar)	Density (kg/m³)	Enthalpy (kJ/kg)	Entropy (kJ/kg-K)
1	79.000	19.960	38.738	680.62	2.4847
2					

Gambar L2.7 Refprop pada Tekanan 75 Psi

- Hasil $h_2 = 680,62$ Kj/kg, setelah h_1 , h_2 , dan h_{2s} sudah dicari maka akan ketemu nilai efisiensi isentropik (η).

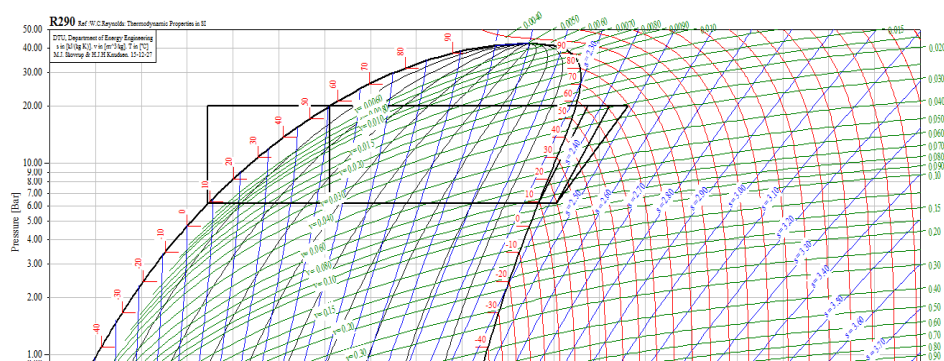
$$\eta = \frac{h_{2s} - h_1}{h_2 - h_1} = \frac{660,514 - 602,743}{680,62 - 602,743} = \frac{57,771}{77,877} = 0,7418$$

- **Cycle 3**

- Masukkan nilai Tek. AC di *Evaporating Temperature*
- Masukkan nilai Tek. *Out* kompresor di *Condensing Temperature*
- $Superheat = T_{\text{pipa out evaporator}} - ET = 28,74 - 9,12 = 19,62^{\circ}\text{C}$
- $Subcooling = CT - T_{\text{pipa out ACWH}} = 57,16 - 48,1 = 9,06^{\circ}\text{C}$
- Masukkan efisiensi isentropik 0,7418

Gambar L2.8 Cycle 3 Coolpack pada Tekanan 75 Psi

- Klik *draw cycle*, maka akan keluar grafik dari hasil cycle 3.



Gambar L2.9 Grafik Hasil Cycle 3 pada Tekanan 75 Psi

- Kemudian pilih *cycle 3* pada *cycle info*.
- Masukkan nilai watt yang dihasilkan kompresor pada *dimensioning*. Klik *update*.

Cycle info [One stage], Refrigerant: R290

Select cycle number:

- (1)
- (2)
- (3)

Delete cycle

Values:

Evaporating temperature [°C]:	9.12	Condensing temperature [°C]:	57.16
Superheat [K]:	10.50	Subcooling [K]:	48.10
Dp evaporator [bar]:	0.00	Dp condenser [bar]:	0.00
Dp suction line [bar]:	0.00	Dp liquid line [bar]:	0.00
Dp discharge line [bar]:	0.00		
Isentropic efficiency [0-1]:	0.74		

Calculated:

Qe [kJ/kg]:	380.288
Qc [kJ/kg]:	458.168
COP:	4.88
W [kJ/kg]:	77.880
Pressure ratio [-]:	3.235

Dimensioning:

Qe [kW]:	3.975
Qc [kW]:	4.789
m [kg/s]:	0.01045203
V [m³/h]:	2.9625
W [kW]:	0.814
Q loss [kW]:	0.000

Volumetric efficiency

n_vol:	0.00
Displacement [m³/h]:	0

Gambar L2.10 Hasil *Cycle Info 3* pada Tekanan 75 Psi

- $Q_c = 4,789 \text{ Kw}$

- **Effisiensi *Heat Exchanger***

$$\eta = \frac{Q_{air}}{Q_c}$$

$$Q_{air} = m \cdot C_p \cdot \Delta T = \frac{1000 \times 0,05}{1800} \times 4180 \times (58,1 - 32,7) = 2949 \text{ w} = 2,949 \text{ Kw}$$

$$\eta = \frac{Q_{air}}{Q_c} = \frac{2,949}{4,789} = 0,6157 = 61,57 \%$$

2. Efisiensi HE pada Tekanan 70 Psi

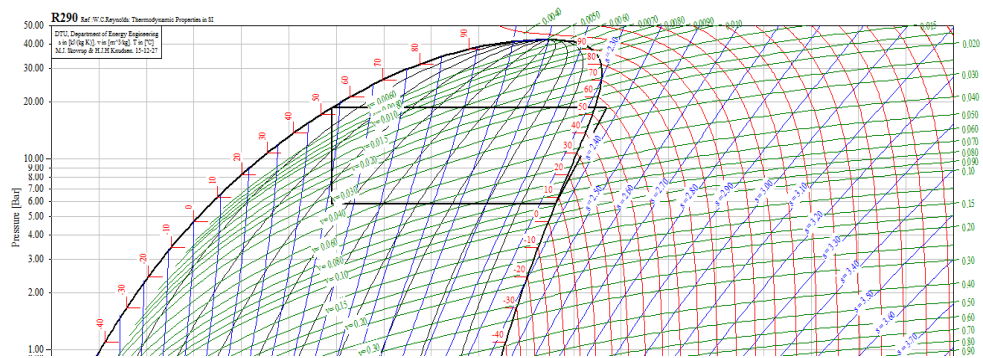
Tabel L2.2 Propertis Efisiensi HE 70 Psi

Temperatur air ACWH	: 58,4 °C
Temperatur air awal	: 31,6 °C
Temperatur pipa in ACWH	: 74,6 °C
Temperatur pipa out ACWH	: 47,0 °C
Temperatur pipa out Kondensor	: 36,8 °C
Temperatur pipa out evaporator	: 26,35 °C
Tekanan AC	: 70 Psi
Tekanan out Kompresor	: 255 Psi

- **Cycle 1**

- Masukkan nilai Tekanan AC di *Evaporating Temperature* (ET).
- Masukkan nilai Tekanan *out* kompresor di *Condensing Temperature* (CT).
- Kemudian klik *draw cycle*. Maka akan terlihat grafik yang menunjukkan kerja kompresor sampai *heat exchanger*.

Gambar L2.11 Cycle 1 Coolpack pada Tekanan 70 Psi



Gambar L2.12 Grafik Hasil *Cycle* 1 pada Tekanan 70 Psi

- Kemudian klik *cycle* info untuk melihat nilai ET dan CT yang sudah dimasukkan.
- Nilai ET = 7,10°C
- Nilai CT = 53,79°C

Cycle info [One stage], Refrigerant: R290

Select cycle number:

(1)

Delete cycle

Values:

Evaporating temperature [°C]:	7.10	Condensing temperature [°C]:	53.79
Superheat [K]:	0.00	Subcooling [K]:	0.00
Dp evaporator [bar]:	0.00	Dp condenser [bar]:	0.00
Dp suction line [bar]:	0.00	Dp liquid line [bar]:	0.00
Dp discharge line [bar]:	0.00		
Isentropic efficiency [0-1]:	1.00		

Calculated:

Qe [kJ/kg]:	235.557
Qc [kJ/kg]:	289.275
COP:	4.39
W [kJ/kg]:	53.718
Pressure ratio [-]:	3.192

Dimensioning:

Qe [kW]:	0.000
Qc [kW]:	0.000
m [kg/s]:	0.00000000
V [m³/h]:	0.0000
W [kW]:	0.000
Q loss [kW]:	0.000

Volumetric efficiency

n_vol: 0.00

Displacement [m³/h]: 0

Gambar L2.13 *Cycle* Info 1 pada Tekanan 70 Psi

• Cycle 2

- Masukkan nilai Tek. AC di ET.
- Masukkan nilai Tek. Out kompresor di CT.
- $Superheat = T_{\text{pipa out evaporator}} - ET = 26,35 - 7,10 = 19,25^{\circ}\text{C}$.

- $Subcooling = CT - T_{pipa\ out\ ACWH} = 53,79 - 47,0 = 6,79^{\circ}C$.

Cycle input

Select cycle type:

☒ One stage ☐ Two stage, closed intercooler

☐ Two stage, open intercooler ☐ Two stage, open intercooler, load at intermediate pressure

Cycle name: ☒ Draw cycle

Values:

Evaporating temperature: 5.82 Bar

Condensing temperature: 18.58 Bar

Superheat: 19.25 °C

Subcooling: 6.79 °C

Dp evaporator: 0.00 Bar

Dp condenser: 0.00 Bar

Dp suction line: 0.00 Bar

Dp liquid line: 0.00 Bar

Isentropic efficiency [0-1]: 1.00

Cycle creation

☒ Create new

Calculated:

Qe [kJ/kg]: 10000.000

Qc [kJ/kg]: 10000.00

COP: 2.34

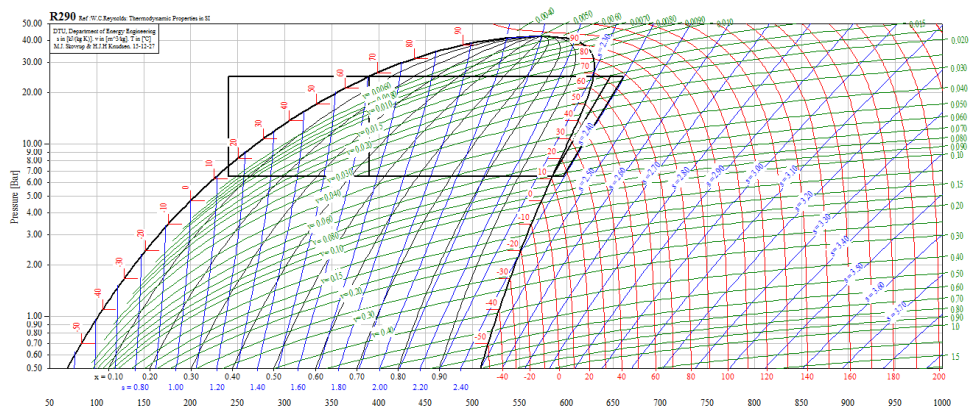
W [kJ/kg]: 10000.00

W high [kW]: 10000.00

(m high)/(m low): 0.00000000

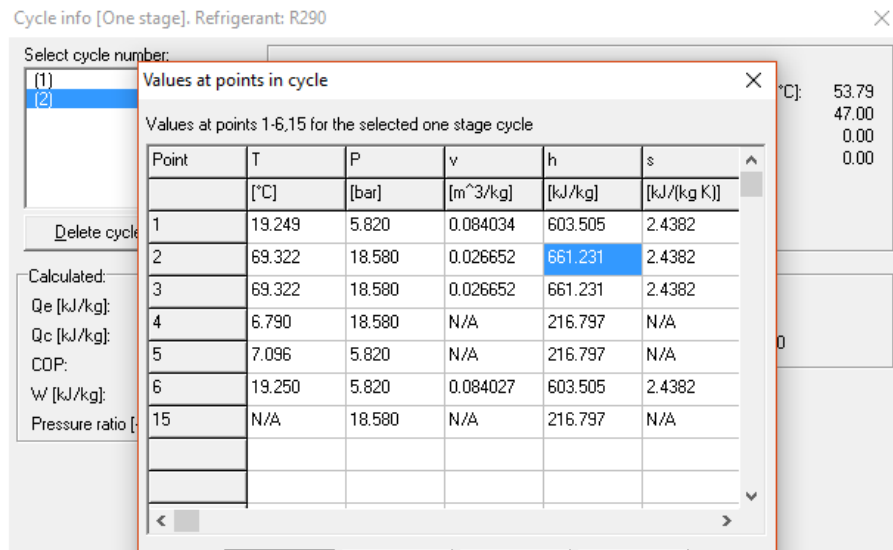
Gambar L2.14 Cycle Info 2 pada Tekanan 70 Psi

- Kemudian klik *draw cycle*. Maka akan terlihat grafik yang menunjukkan kerja kompresor, *heat exchanger*, dan kondensor.



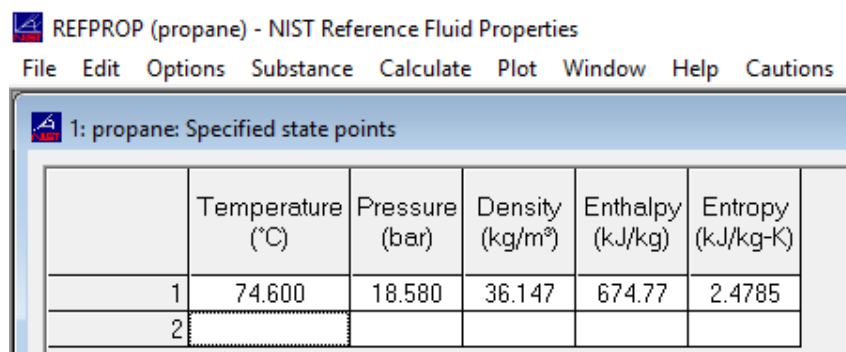
Gambar L2.15 Grafik Hasil Cycle 2 pada Tekanan 70 Psi

- Kemudian klik *cycle info*, pilih *cycle number 2*. Lalu klik *Coordinates of points*. Catat hasil dari h_1 dan h_2 .
- Nilai $h_1 = 603,505$ kJ/kg, $h_2 = h_{2s} = 661,231$ kJ/kg.



Gambar L2.16 Values at point in cycle 2

- Setelah itu, buka aplikasi Refprop untuk mencari h_2 .
- Klik option unit, temperatur K menjadi °C, pressure Mpa menjadi bar.
- Klik *substance, purefluid (singel compounds)*, pilih propane, klik ok.
- Klik *calculate, spesifited state points*.
- Masukkan Tpipa in HE dan Tekanan out Kompresor, klik enter.



Gambar L2.17 Refprop pada Tekanan 70 Psi

- Hasil $h_2 = 674,77$ kJ/kg, setelah h_1 , h_2 , dan h_{2s} sudah dicari maka akan ketemu nilai efisiensi isentropik (η).

$$\eta = \frac{h_{2s} - h_1}{h_2 - h_1} = \frac{661,231 - 603,505}{674,77 - 603,505} = \frac{57,726}{71,265} = 0,81$$

• Cycle 3

- Masukkan nilai Tek. AC di ET.
- Masukkan nilai Tek. *Out* kompresor di CT.
- $Superheat = T_{\text{pipa out evaporator}} - ET = 26,35 - 7,10 = 19,25^\circ\text{C}$
- $Subcooling = CT - T_{\text{pipa out ACWH}} = 53,79 - 47,0 = 6,79^\circ\text{C}$
- Masukkan efisiensi isentropik 0,81

Cycle input

Select cycle type:

- ☒ One stage
- ☐ Two stage, closed intercooler
- ☐ Two stage, open intercooler
- ☐ Two stage, open intercooler, load at intermediate pressure

Cycle name: ☒ Draw cycle

Values:

Evaporating temperature:	5.82 Bar	Condensing temperature:	18.58 Bar
Superheat:	19.25 °C	Subcooling:	6.79 °C
Dp evaporator:	0.00 Bar	Dp condenser:	0.00 Bar
Dp suction line:	0.00 Bar	Dp liquid line:	0.00 Bar
Dp discharge line:	0.00 Bar		
Isentropic efficiency [0-1]:	0.81	Q loss...	

Cycle creation

☒ Create new

Calculated:

Qe [kJ/kg]: 10000.000

Qc [kJ/kg]: 10000.00

COP: 2.34

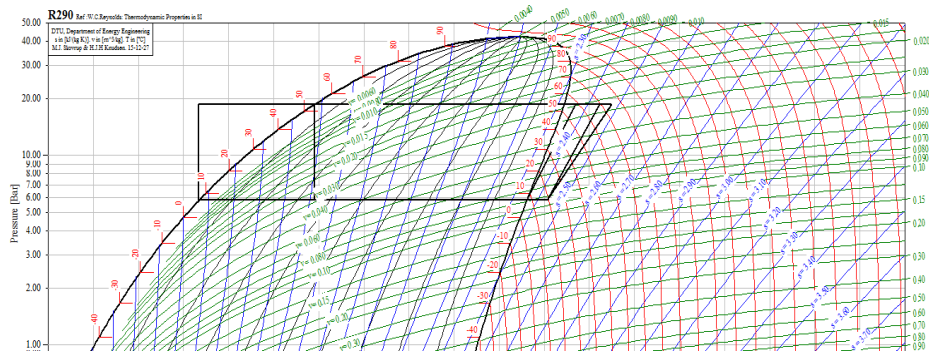
W [kJ/kg]: 10000.00

W high [kW]: 10000.00

(m high)/(m low): 0.00000000

Gambar L2.18 *Cycle 3* Coolpack pada Tekanan 70 Psi

- Klik *draw cycle*, maka akan keluar grafik dari hasil *cycle 3*.
- Kemudian pilih *cycle 3* pada *cycle info*.
- Masukkan nilai watt yang dihasilkan kompresor pada *dimensioning*. Klik *update*.



Gambar L2.19 Grafik Hasil Cycle 3 pada Tekanan 70 Psi

Cycle info [One stage], Refrigerant: R290

Select cycle number:

(1)
(2)
(3)

Delete cycle

Values:

Evaporating temperature [°C]:	7.10	Condensing temperature [°C]:	53.79
Superheat [K]:	12.15	Subcooling [K]:	47.00
Dp evaporator [bar]:	0.00	Dp condenser [bar]:	0.00
Dp suction line [bar]:	0.00	Dp liquid line [bar]:	0.00
Dp discharge line [bar]:	0.00		
Isentropic efficiency [0-1]:	0.81		

Calculated:

Qe [kJ/kg]:	386.708
Qc [kJ/kg]:	457.974
COP:	5.43
W [kJ/kg]:	71.266
Pressure ratio [-]:	3.192

Dimensioning:

Qe [kW]:	4.178
Qc [kW]:	4.948
m [kg/s]:	0.01080461
V [m³/h]:	3.2686
W [kW]:	0.770
Q loss [kW]:	0.000

Volumetric efficiency

n_vol: 0.00

Displacement [m³/h]: 0

OK Coordinates of points... Print Copy Update Help

Gambar L2.20 Hasil Cycle Info 3 pada Tekanan 70 Psi

- Maka pada bagian *dimensioning* akan keluar hasilnya.

- $Q_c = 4,948 \text{ Kw}$.

• **Effisiensi *Heat Exchanger***

$$\eta = \frac{Q_{air}}{Q_c}$$

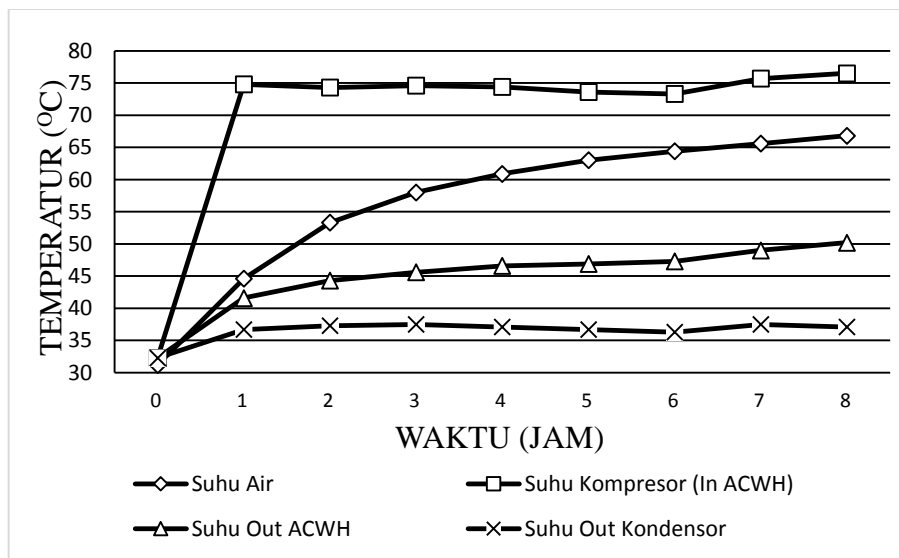
$$Q_{air} = m \cdot C_p \cdot \Delta T = \frac{1000 \times 0,05}{1800} \times 4180 \times (58,4 - 31,6) = 3112 \text{ w} = 3,112 \text{ Kw}$$

$$\eta = \frac{Q_{air}}{Q_c} = \frac{3,112}{4,948} = 0,628 = 62,8 \%$$

Lampiran 3 Pengujian 8 Jam ACWH Pada Tekanan 70 Psi

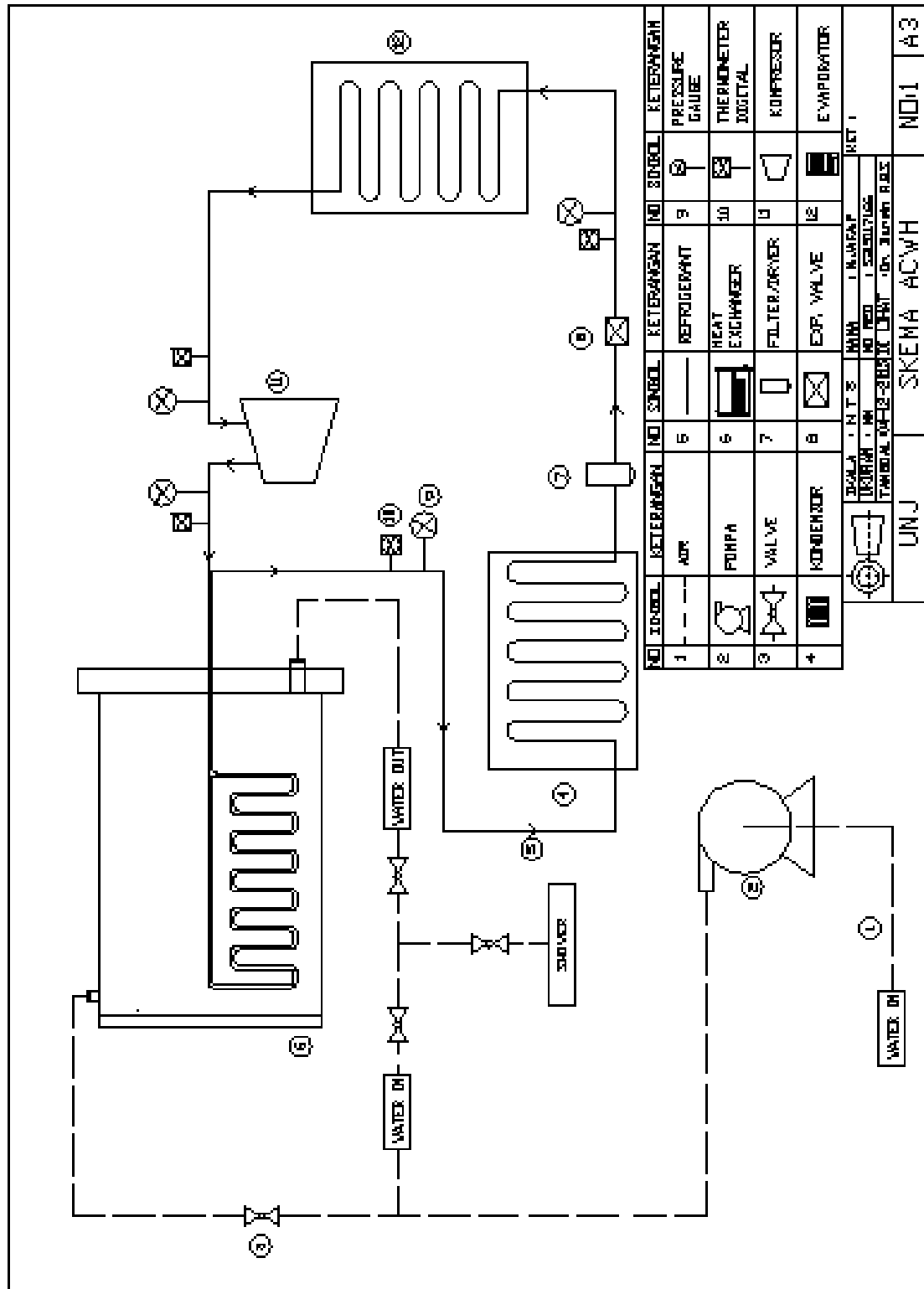
Tabel L3.1 Pengujian 8 Jam ACWH 70 Psi

Waktu	Temperatur Air	Temperatur Kompresor (In HE)	Temperatur Out HE	Temperatur Out Kondensor
0	31,2	32,3	32,3	32,3
1	44,6	74,8	41,6	36,7
2	53,3	74,3	44,3	37,3
3	58,0	74,6	45,6	37,5
4	60,9	74,4	46,6	37,1
5	63,0	73,6	46,9	36,7
6	64,4	73,3	47,3	36,3
7	65,6	75,7	49,0	37,5
8	66,8	75,2	50,2	37,1

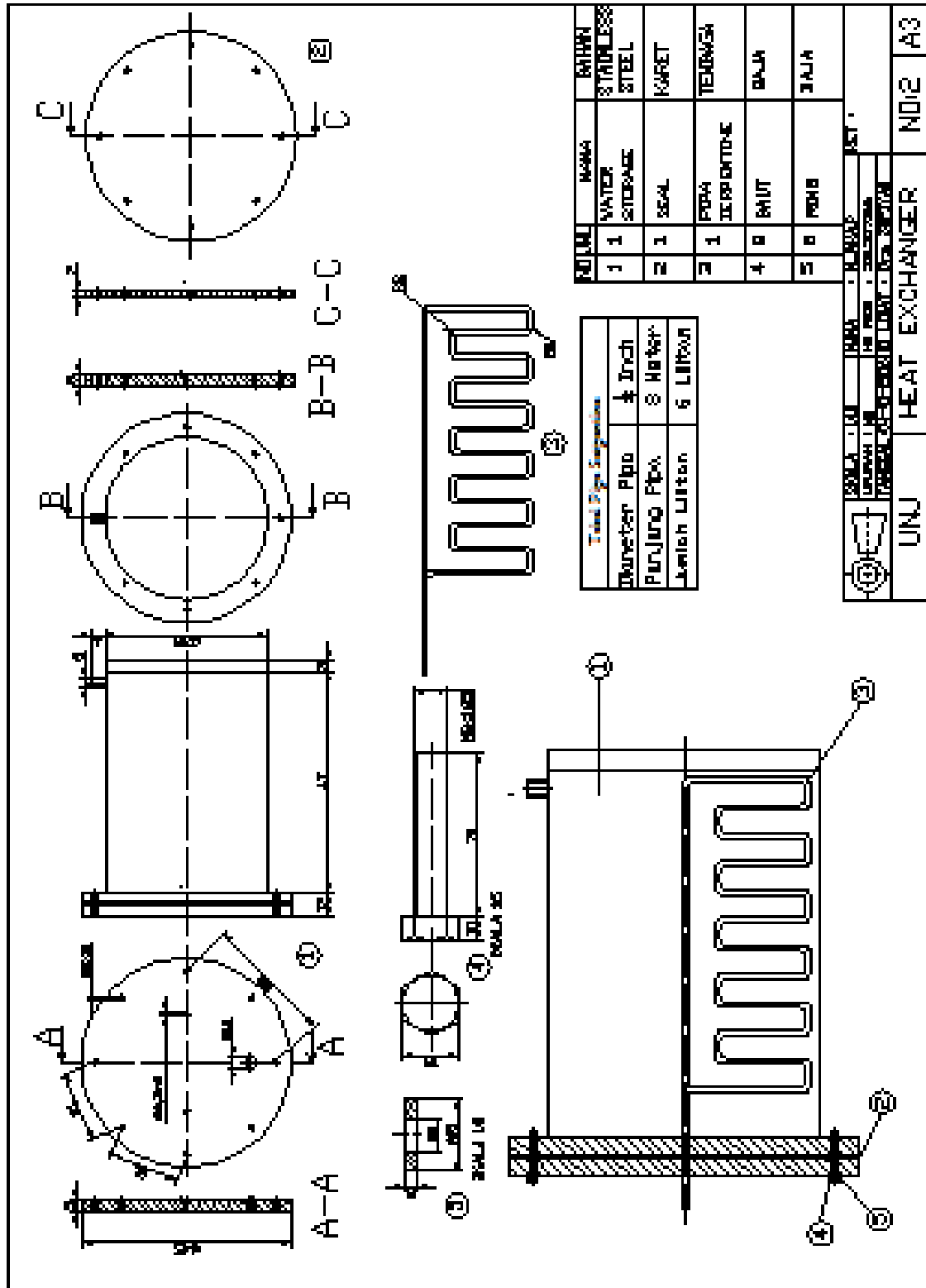


Gambar L3.1 Grafik Temperatur ACWH Pengujian 8 Jam 70 Psi

Skema ACWH



Heat Exchanger



Lampiran 6 *Heat Exchanger*

